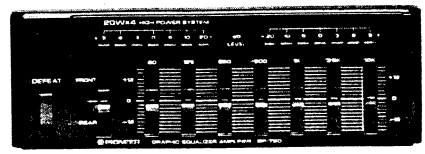
PIONEER

W19

Service Manual



ORDER NO.
CRT-481-0

GRAPHIC EQUALIZER/AMPLIFIER

BP-780

US, CA, ES, EW

SPECIFICATIONS

Power source	14.4V DC (10.8—15.6V allowable)
Grounding system	Negative type
Max. current consumption	8A
Dimensions	150(W)×50(H)×150(D)mm [5-3/8(W)×2(H)×5-3/8(D)in.]
Weight	1.3kg (2.9lbs.)

Continuous power output is 12W per channel min. into 4 ohms, both channels driven 50 to 20,000Hz with no more than 5% THD.

Maximum power output	20W×4
Load impedance	4Ω (4—8Ω allowable)
Frequency response	20—50,000Hz (±3dB)
Signal-to-noise ratio	90dB (IHF-A network, at 1W)
Distortion	0.5% (at 1.5W, 1kHz)
Input level	COMPO: 70mV/20kΩ LINE IN: 200mV/15kΩ BOOSTER: 3V/120Ω
Equalization frequency	60Hz, 125Hz, 250Hz, 500Hz, 1kHz, 3.5kHz, 10kHz
Gain	0dB
Equalization range	±12dB

These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.

Note:
Specifications and the design are subject to possible modification without notice due to improvements.

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1.PARTS LOCATION

NOTE: • *For your Parts Stock Control, the fast moving items are indicated with the marks ★ ★ and ★.*
★ ★: GENERALLY MOVES FASTER THAN ★.
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

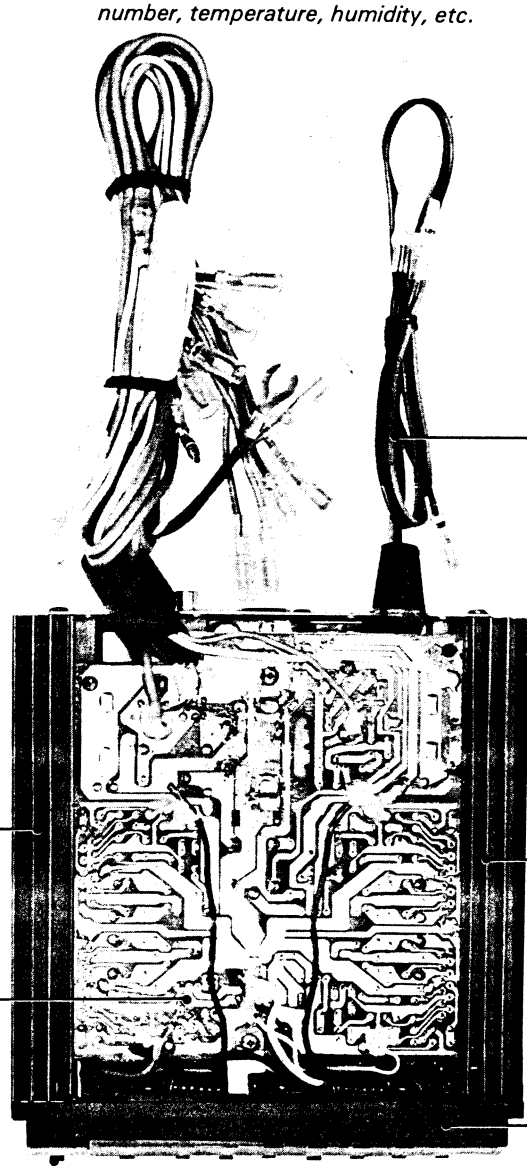


Fig. 1

QUESTIONNAIRE

MODEL _____

One Model per questionnaire

Dear Servicer,

Thank you for your cooperation in the post-sale service of Pioneer products.

This questionnaire is used as a tool to improve the serviceability of our products and service manuals. Please evaluate this model and service manual by answering the following questions. Your ideas may be realized in our future products. Your answers will be appreciated. Thank you.

PIONEER ELECTRONIC CORP.

T. Nakagawa, Manager, Service Section, International Division

1. SERVICING EVALUATION	Circle applicable number:	Good		Fair		Poor
a. Disassembly/Re-assembly:		1	2	3	*4	*5
b. Circuit Checks:		1	2	3	*4	*5
c. Replacement of Parts:		1	2	3	*4	*5
d. Adjustment (s):		1	2	3	*4	*5

* If (4) or (5) was circled, please be specific.

e. Your advice, opinion or ideas related to servicing this product.

2. SERVICE MANUAL EVALUATION

a. Circuit & Mechanism Description

b. Circuit Diagram

3. OTHER

Please describe other areas of servicing which you may find difficult.

Completed by : Date :

Company Name :

Address :

City/State/Zip :

Please send this form filled to the distributor in your country.

2. NAME OF PARTS and THEIR FUNCTION

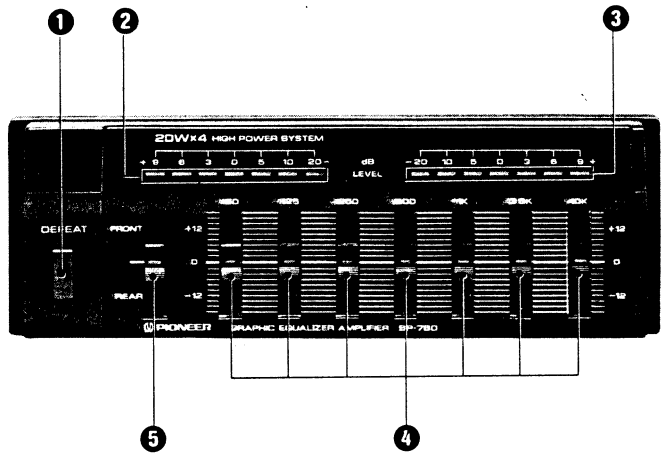


Fig. 2

❶ Equalizer Switch (DEFEAT)

Press to activate the equalizer control function and illuminate the indicator on the equalizer control lever.

❷ Lch Level Indicator

❸ Rch Level Indicator

Green, orange and red indicators illuminate corresponding to the left/right output levels.

❹ Equalizer Control

Slides up and down to allow adjustment to suit both the music and individual tastes. Pressing the equalizer switch causes each indicator to illuminate.

❺ Fader Control

Raising the lever gradually decreases the volume of the rear speakers, while lowering it gradually decreases the volume of the front speakers. Adjust the volume of the front and rear speakers.

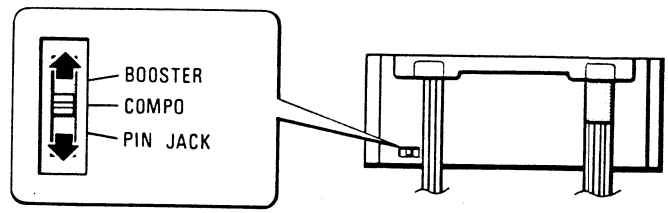
3.CONNECTION

Connect the components correctly as shown in the diagram.

- Test-connect all components before securing them into place. Test-operate your entire car stereo system to ensure that there are no faulty wiring connections between this unit and the rest of your car stereo system.
- Be sure to connect only a single component as shown in the connection diagram. If two or more components are connected, internal circuitry may be damaged or an accident may occur.
- When using this unit in combination with a car stereo equipped with pin jacks, see the section entitled "When combined with a car stereo with pin jacks".
- Speakers connected to this unit must be high power type with over 20W maximum input power and have impedance between 4 and 8 ohms. Be aware of the fact that using a speaker other than the one specified can cause the speaker to be damaged.
- A special BPTL circuit is used to be sure that you do not connect the speaker directly to ground nor join the left and right speaker (−) leads.
- For detailed information concerning connections between different components and this unit consult their respective instruction manuals and follow those recommendations precisely.
- Be sure not to remove the cap on the red lead (female plug) of this unit when not in use to prevent shorting.
- Wire all connecting cords so that they stay well clear of high-temperature areas such as the heater exhaust port.
- To ensure that all components used in combination with this unit operate properly, be sure to wire the main power supply cable (red) correctly to the respectively determined points. Failure to do so or errors in this process will result in total inoperation.
- Be sure to properly connect the color coded leads. Failure to do so can cause malfunctions.

Input Selector

Be sure to set the input selector before wiring. (Fig. 3)



COMPO: When connecting the unit with a component car stereo.

BOOSTER: When connecting the unit with a regular car stereo.

PIN JACK: When connecting the unit with a car stereo with pin jacks.

Fig. 3

When Combined with a Component Car Stereo

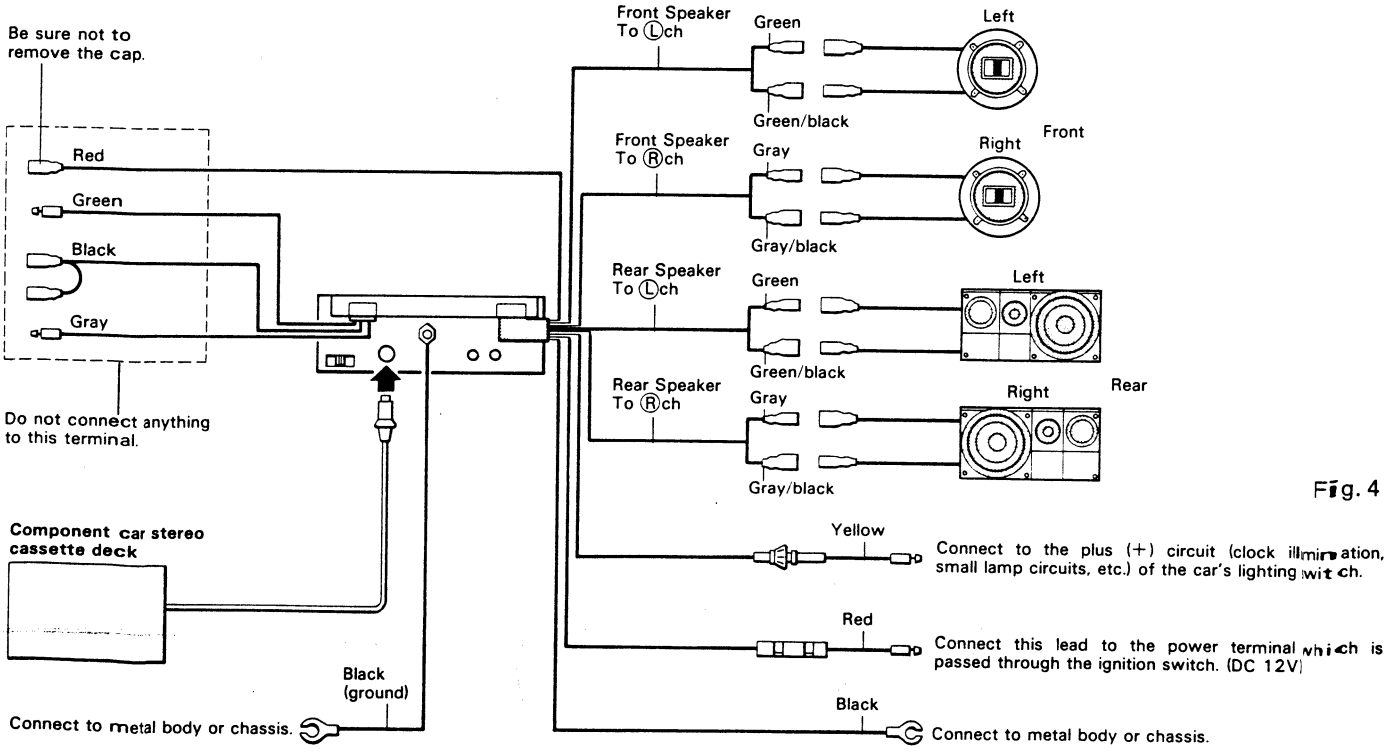


Fig. 4

When Combined with a Regular Car Stereo

- Use a regular power car stereo with a maximum output of 6.5W+6.5W or less.

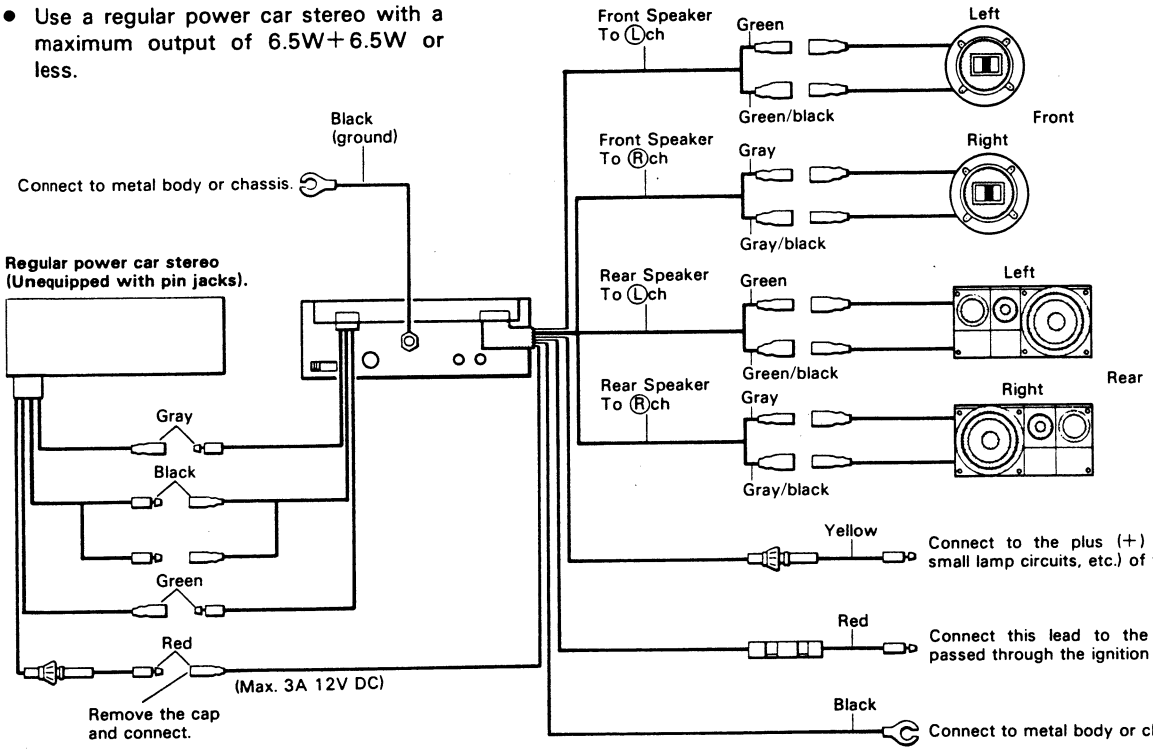


Fig. 5

When Combined with a Car Stereo with Pin Jacks

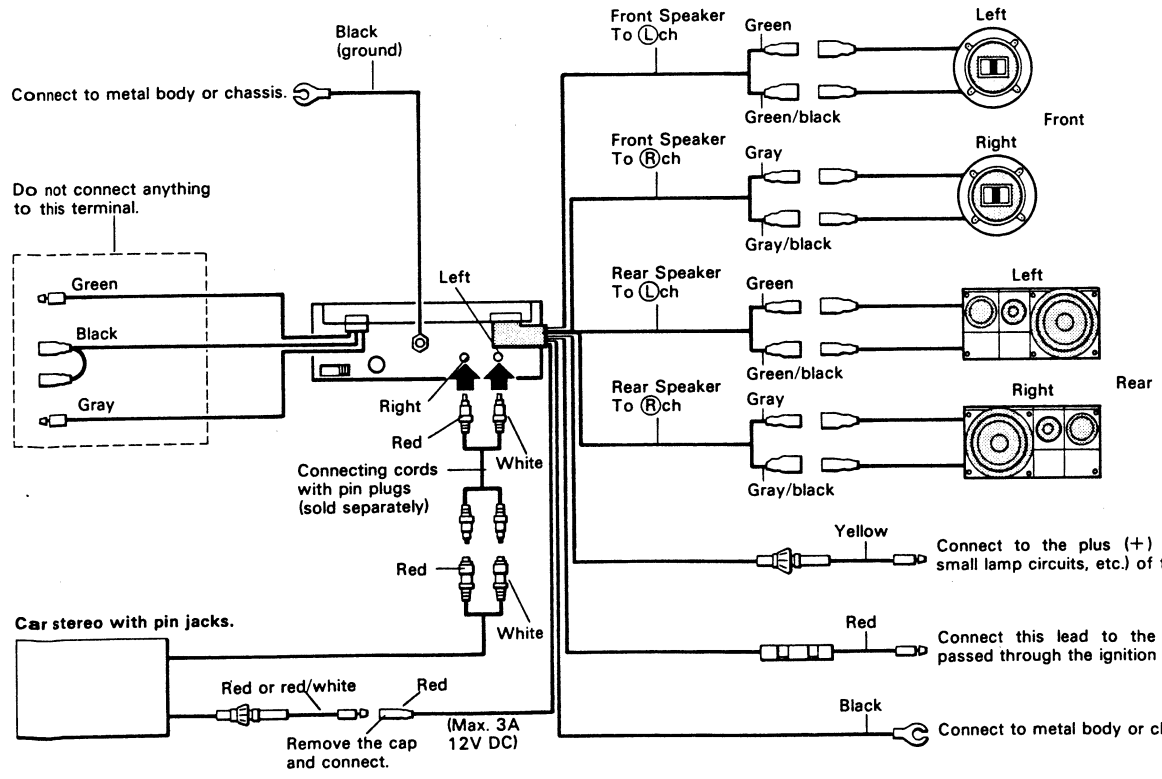


Fig. 6

4. CIRCUIT DESCRITION

- **Block Diagram**

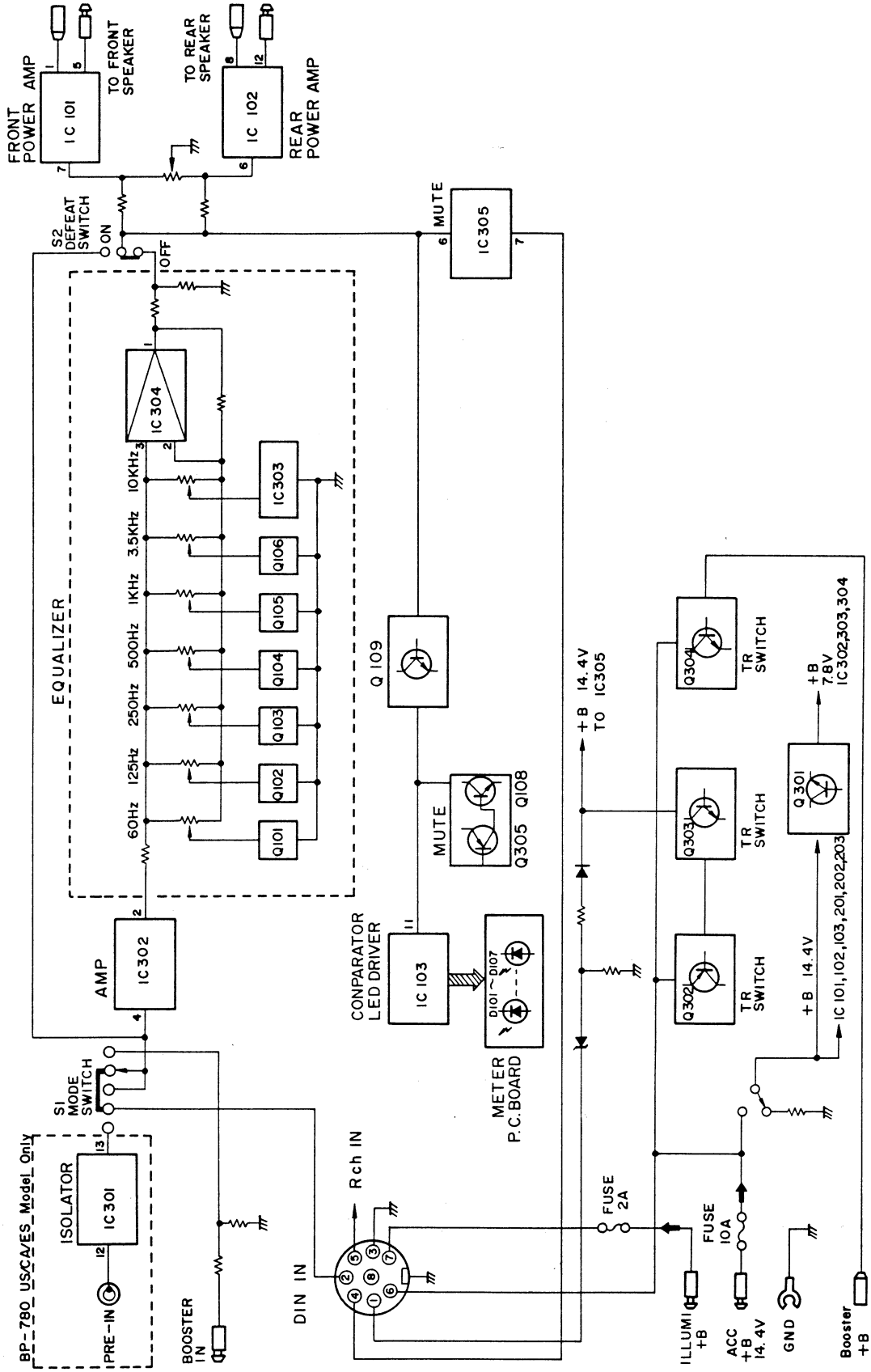


Fig. 7

• Level Diagram

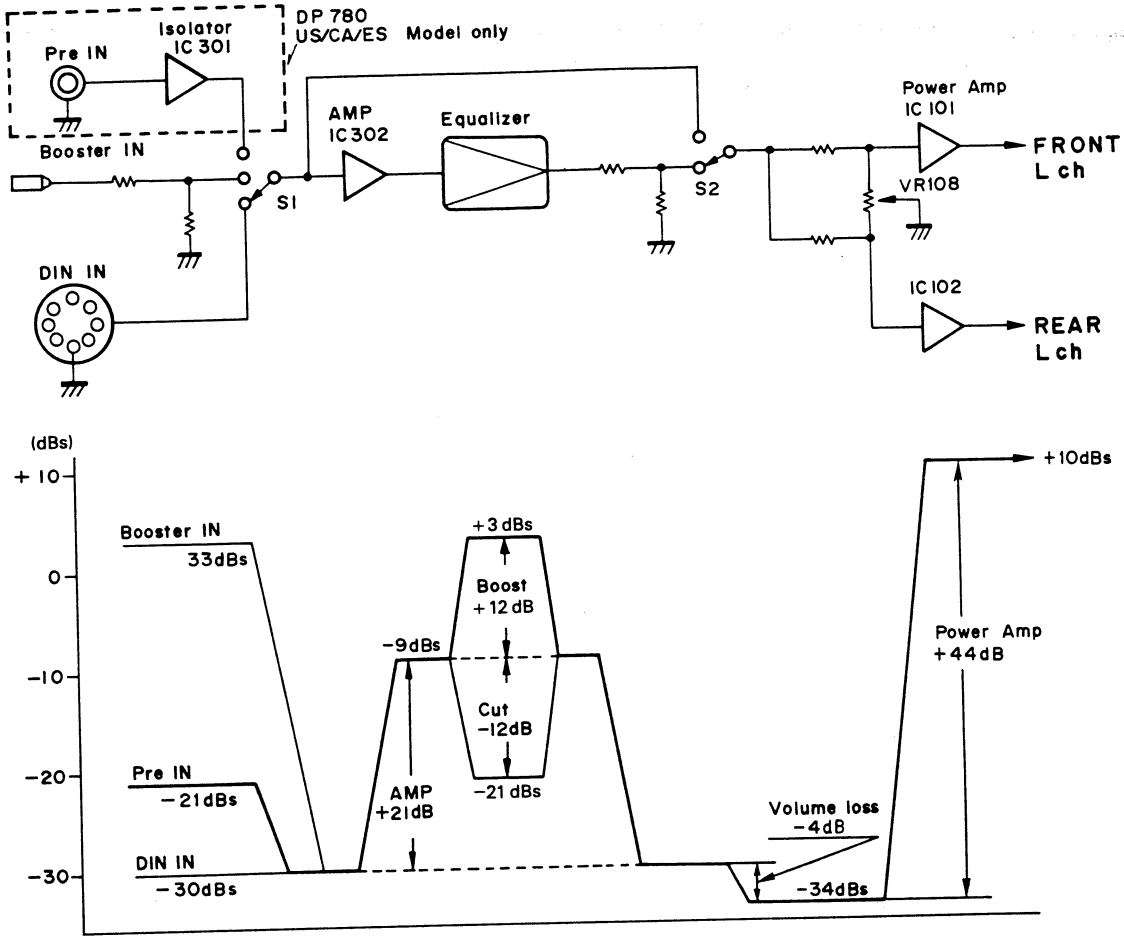
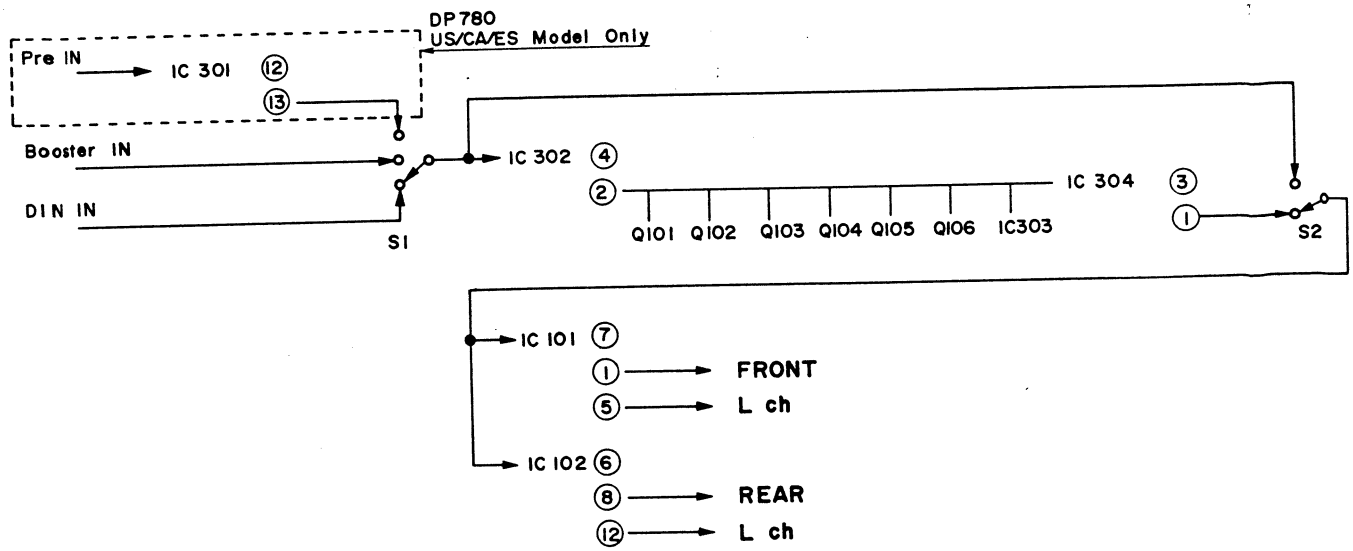


Fig. 8

• Audio Signal path (Lch)



Symbols explanation

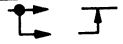
Symbols	Description
	Division and synthesis
IC 301 12	A signal will be input to pin 12 of IC 301
13 →	and a signal will be output from pin 13

Fig. 9

5.DISASSEMBLY

• Removal of Case

1. The case can be removed by removing the four screws labled "A."

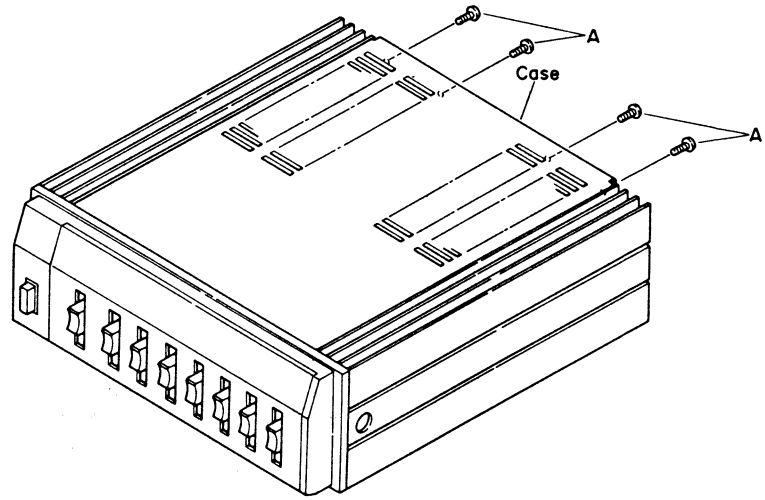


Fig. 10

• Removal of Chassis

1. The Chassis can be removed by removing the five screws labeled "B" and the two rivets.

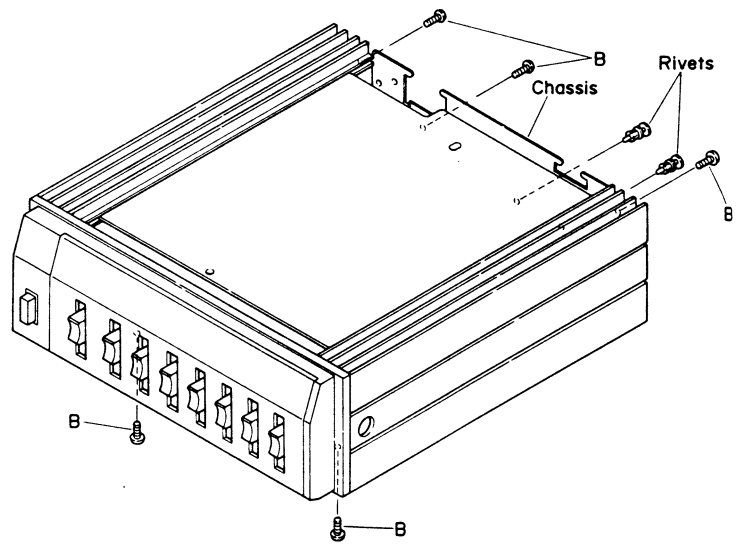


Fig. 11

• Removal of Grille Assembly

1. The grille assembly can be removed by removing the three screws labeled "C."

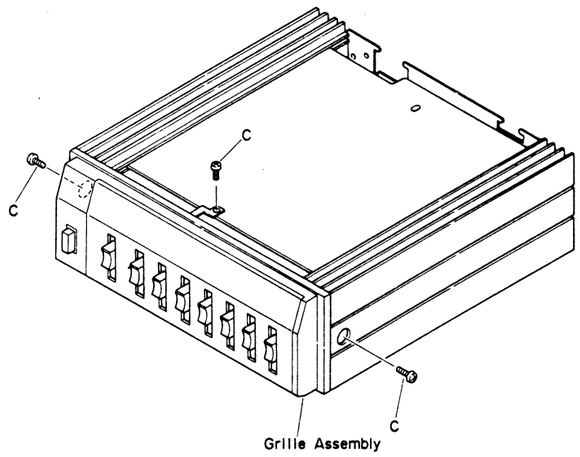
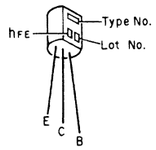


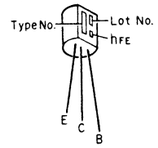
Fig. 12

• ICs and Transistors

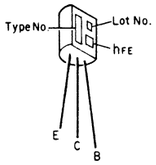
2SA933
2SC1740S



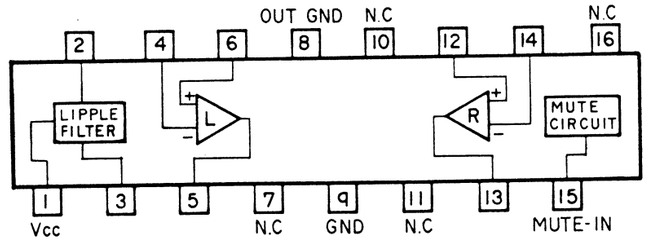
2SA1015
2SC1815



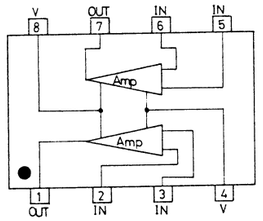
2SC1959
2SD1292



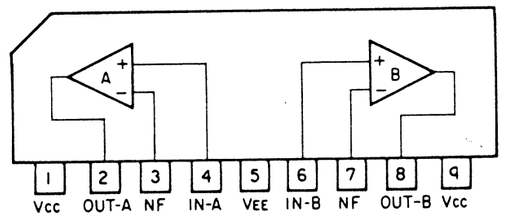
PA2014



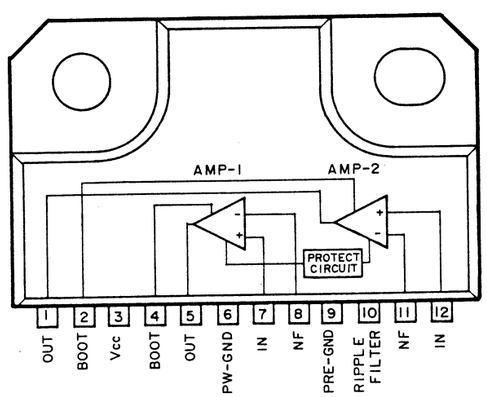
TA75558P
NJM4558



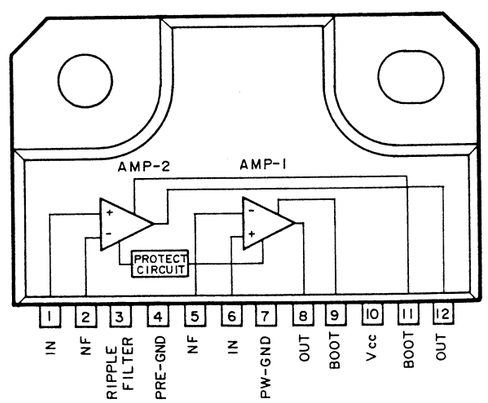
TA75558S
NJM4558S



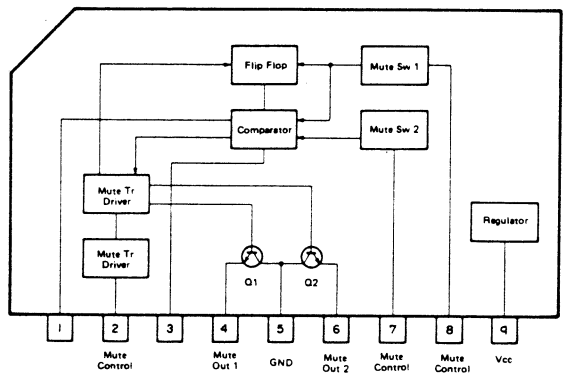
TA7271P



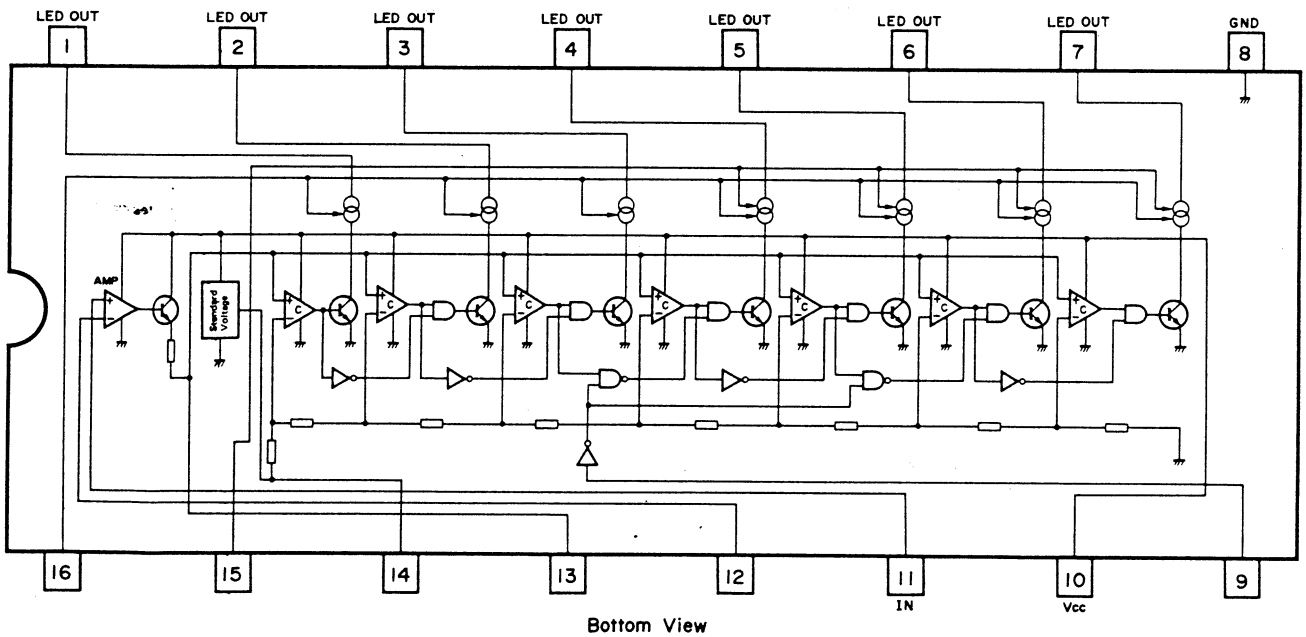
TA7270P



TA7362P

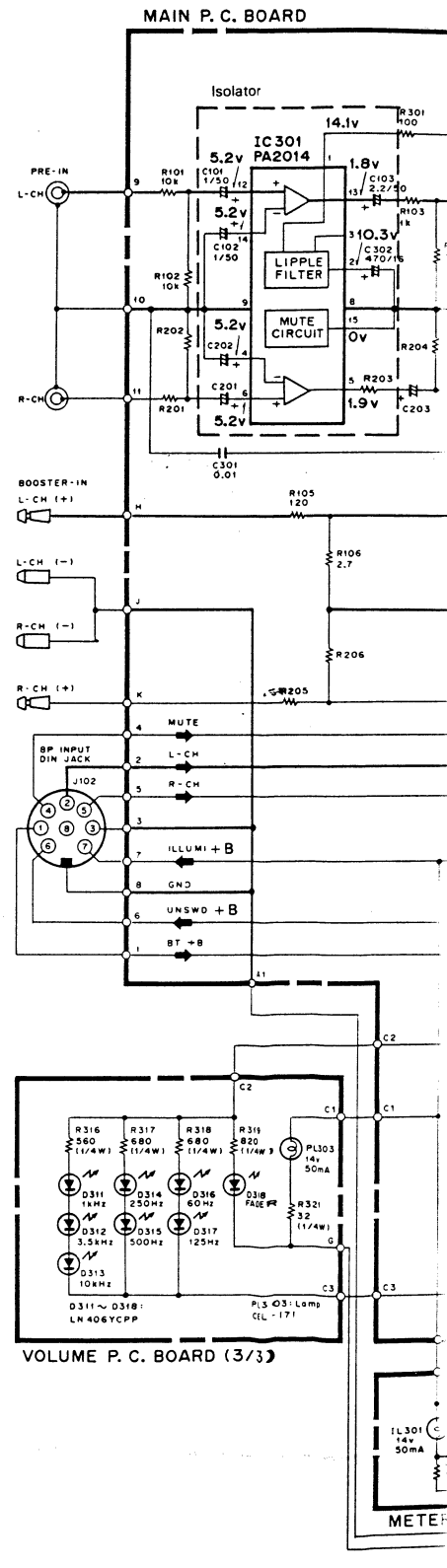


IR2E02

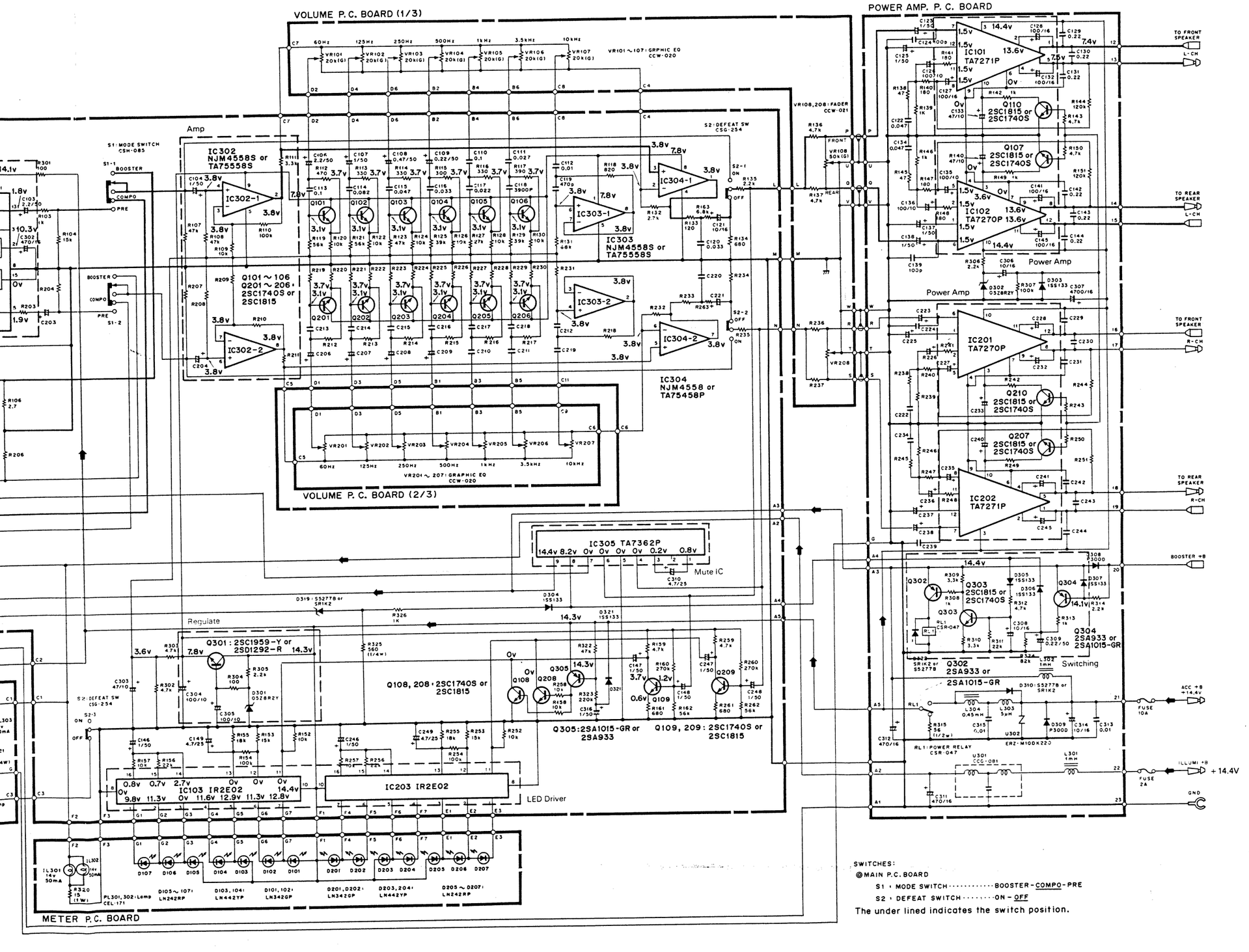


Bottom View

6.SCHEMATIC CIRCUIT DIAGRAM (BP-780/US, CA, ES)



ES)



SWITCHES:

◎MAIN P.C. BOARD

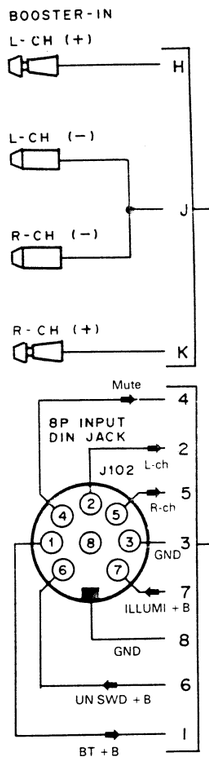
S1 : MODE SWITCH ·····BOOSTER - COMPO - PRE

S2 : DEFEAT SWITCH ·····ON - OFF

The under lined indicates the switch position.

Fg. 13

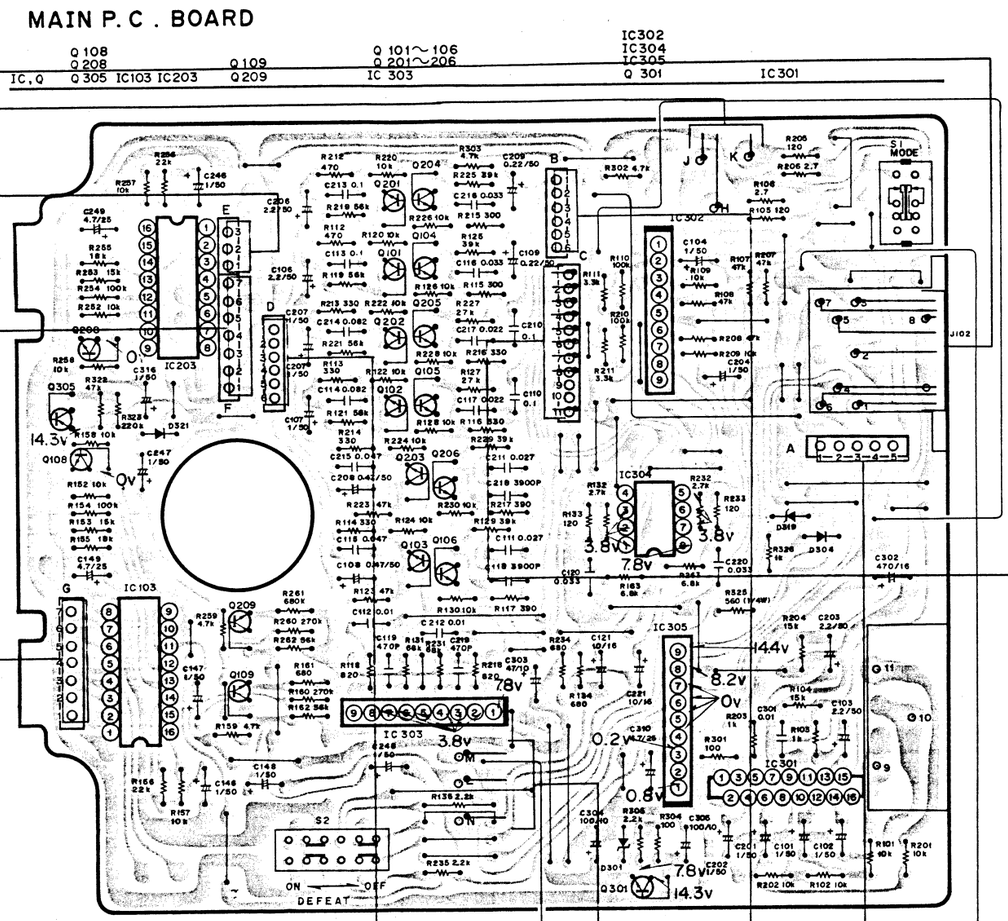
7.CONNECTION DIAGRAM (BP-780/US, CA, ES)

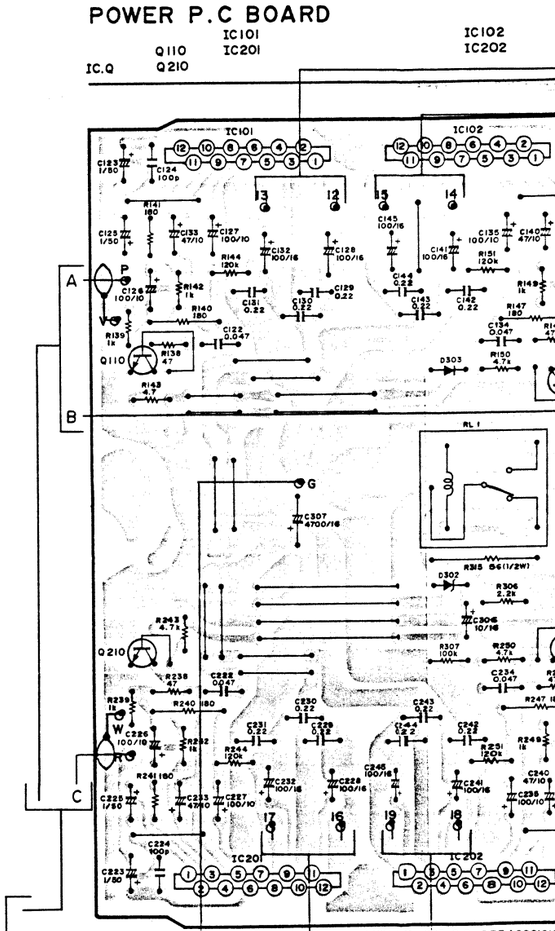


	IC103	IC302
1	4.8	
2	11.3	3.8
3	0	3.8
4	11.6	3.8
5	12.9	0
6	11.3	3.8
7	12.8	3.8
8	0	3.8
9		7.8 (V)
10	14.4	
11	0	
12	0	
13	0	
14	2.7	
15	0.7	
16	0.8	

	Q101～106 Q201～206	Q109
E	3.7	0.6
C	7.8	3.7
B	3.1	1.2

(V)





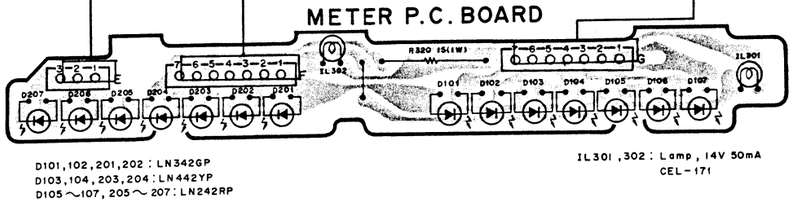
IC101,202 : TA7271P
IC102,201 : TA7270P

Q107,110,207,210,303 : 2SC1815-GR or 2SA933S-GR
Q302,304 : 2SA1015-GR or 2SA933S-GR

IC103,203 : IR2E02
IC301 : PA2014
IC302,303 : NJM4558S or TA7558S
IC304 : NJM4558 or TA75458P
IC305 : TA7362P

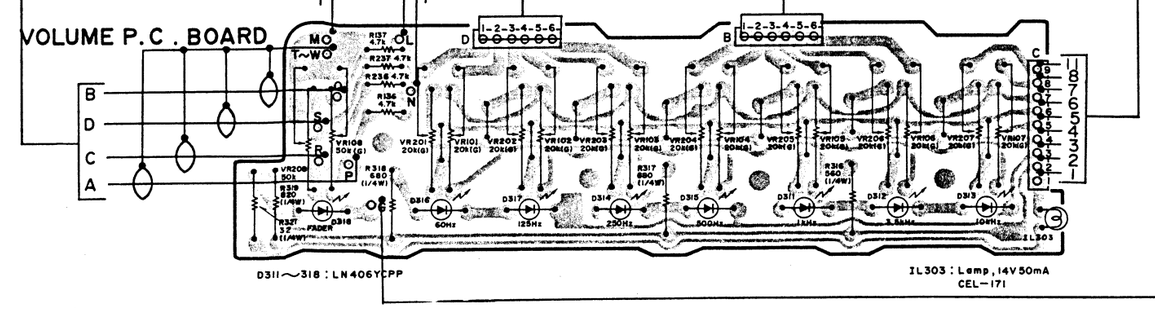
Q 101～106, 109 : 2SC1740S or 2SC1815
Q 201～206, 209 : 2SC1740S or 2SC1815
Q 301 : 2SC1959-Y or 2SD1292-R
Q 305 : 2SA933 or 2SA1015-GR

D301 : 05Z8R2Y
D304,321 : 1SS133
D319 : SR1K2 or S5277B



D101,102,201,202 : LN342GP
D103,104,203,204 : LN442YP
D105～107, 205～207 : LN242RP

IL301,302 : Lamp, 14V 50mA CEL-171

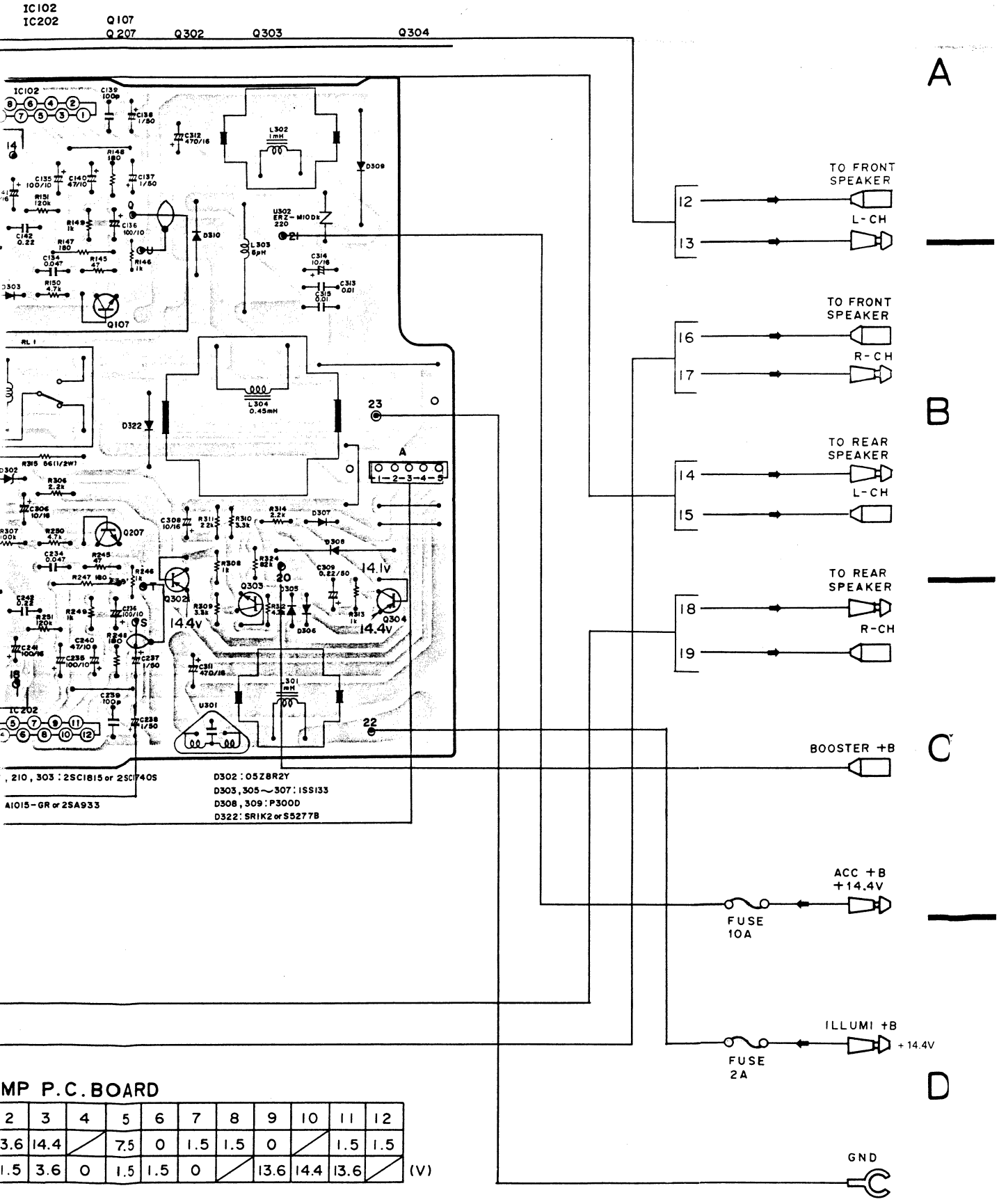


D311～318 : LN406YCPP

IL303 : Lamp, 14V 50mA CEL-171

POWER AMP P.C.E

	1	2	3	4
IC101	7.4	13.6	14.4	
IC102	1.5	1.5	3.6	0

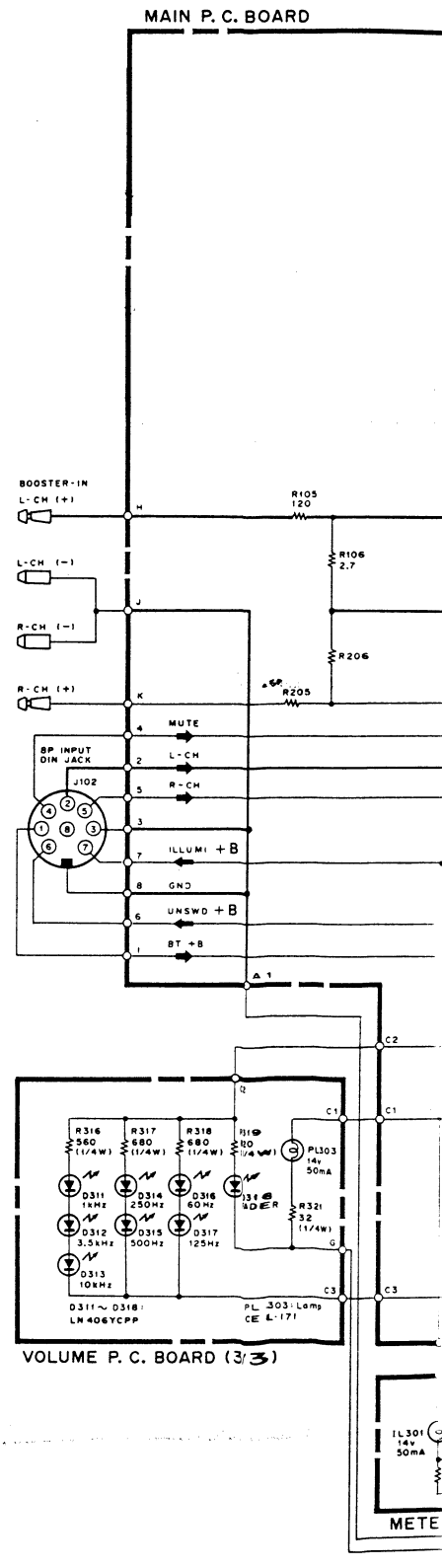


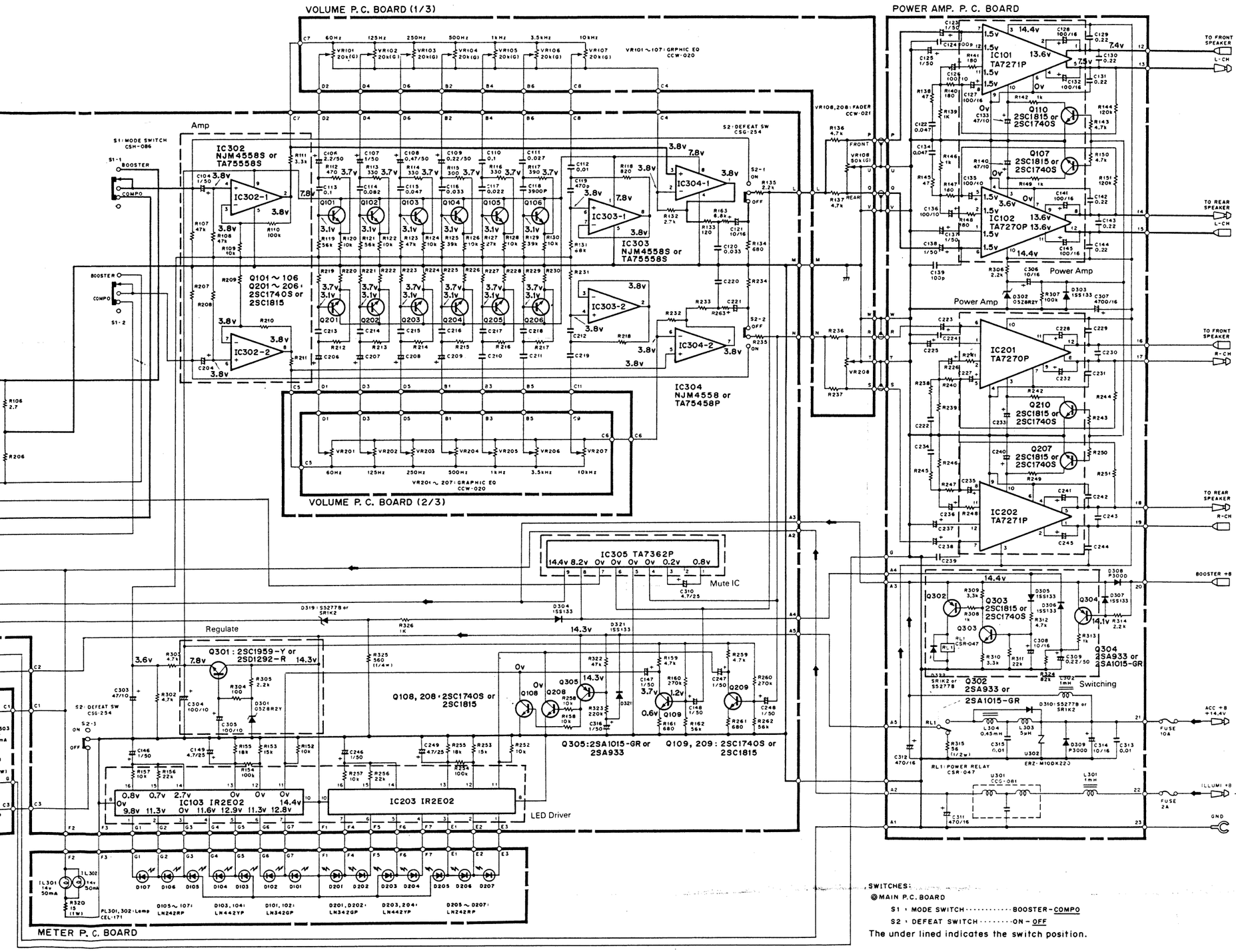
MP P.C.BOARD

2	3	4	5	6	7	8	9	10	11	12	
3.6	14.4	/	7.5	0	1.5	1.5	0	/	1.5	1.5	
1.5	3.6	0	1.5	1.5	0	/	13.6	14.4	13.6	/	(V)

Fig. 14

8.SCHEMATIC CIRCUIT DIAGRAM (BP-780/EW)





SWITCHES:

◎MAIN P.C. BOARD

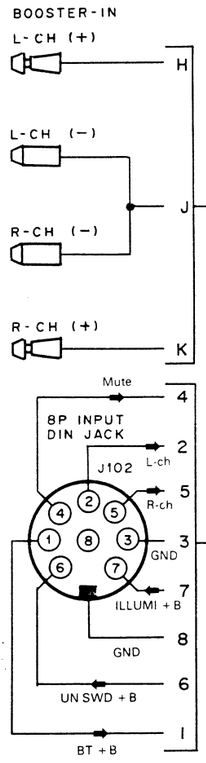
S1 : MODE SWITCH ..... BOOSTER - COMPO

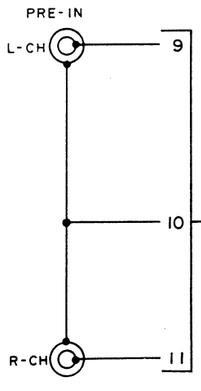
S2 : DEFEAT SWITCH ..... ON - OFF

The under lined indicates the switch position.

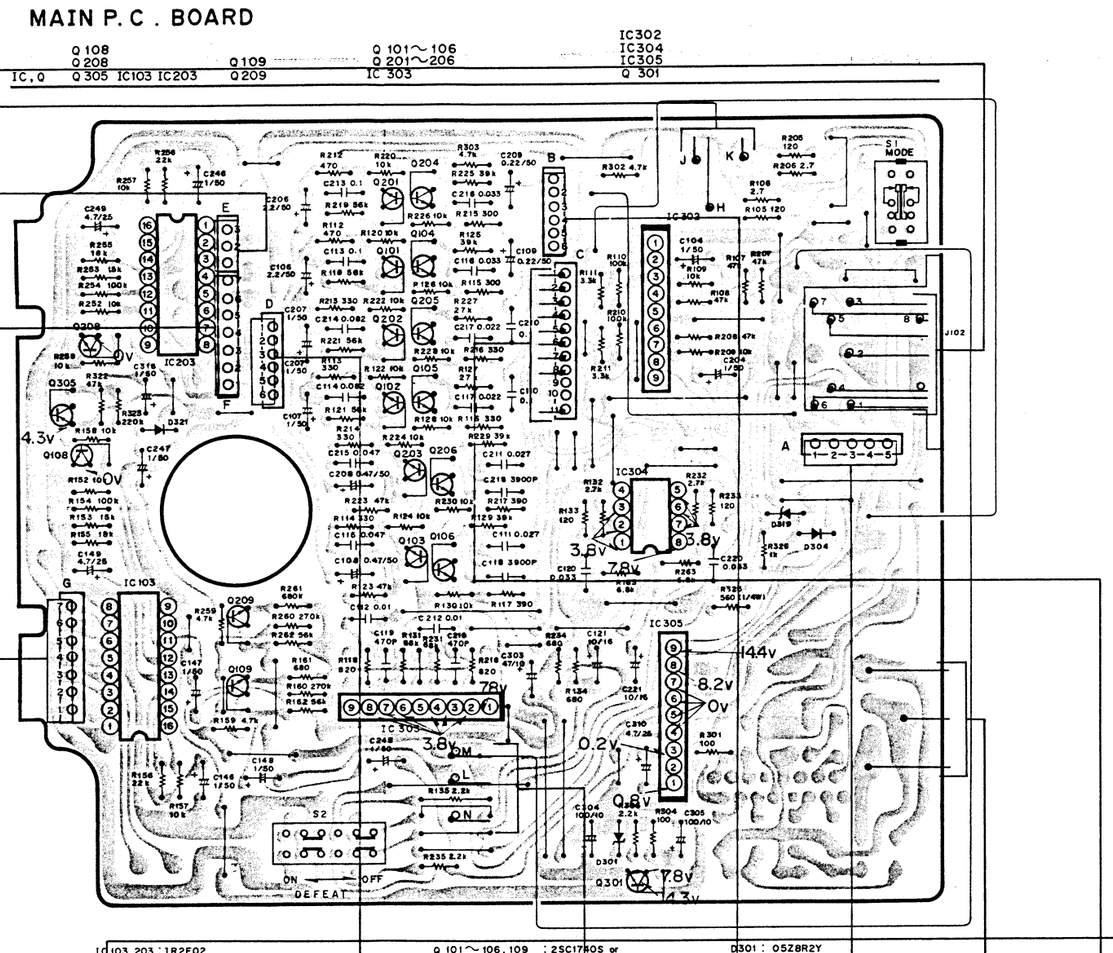
Fig.15

9.CONNECTION DIAGRAM (BP-780/EW)





MAIN P. C . BOARD



MAIN P. C. BOARD

	IC103	IC301	IC302
1	4.8	14.1	
2	11.3	10.3	3.8
3	0		3.8
4	11.6	5.2	3.8
5	12.9	1.9	0
6	11.3	5.2	3.8
7	12.8		3.8
8	0	0	3.8
9		0	7.8
10	14.4		
11	0		
12	0	5.2	
13	0	1.8	
14	2.7	5.2	
15	0.7	0	
16	0.8		(V)

	Q101～106 Q201～206	Q109
E	3.7	0.6
C	7.8	3.7
B	3.1	1.2

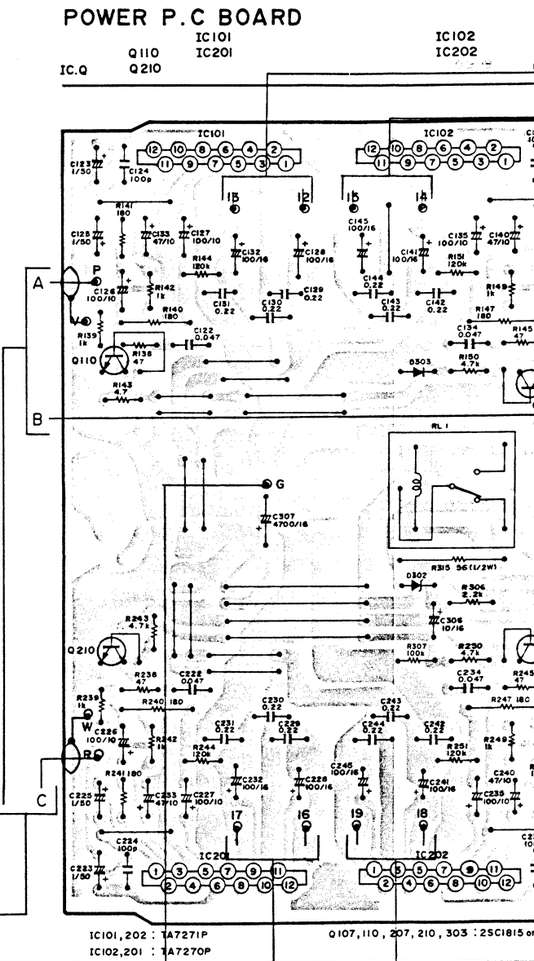
(V)

IC103,203 : 1R2E02
IC302,303 : NJM4558S or TA7558S
IC304 : NJM4558 or TA75458P
IC305 : TA7362P

Q 101～106, 109 : 2SC1740S or
Q 201～206, 209 2SC1815
Q 301 : 2SC1959-Y or 2SD1292-R
Q 305 : 2SA933 or 2SA1015-GR

D301 : 05Z8R2Y
D304, 321 : 1SS133
D319 : SR1K2 or S5277B

POWER P.C BOARD



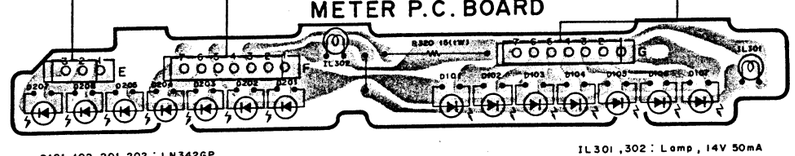
IC101, 202 : TA7271P
IC102, 201 : TA7270P

Q107, 110, 207, 210, 303 : 2SC1815 or
Q302, 304 : 2SA1015-GR or 2SA933

POWER AMP P.C.BO

	1	2	3	4	
IC101	7.4	13.6	14.4		
IC102	1.5	1.5	3.6	0	

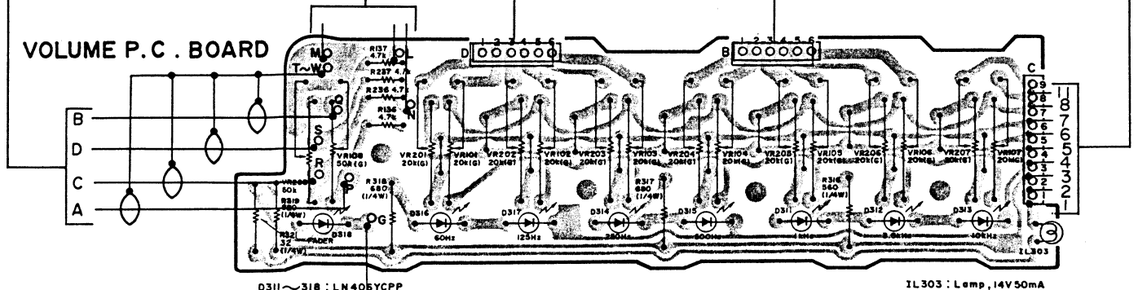
METER P.C. BOARD



D101, 102, 201, 202 : LN342GP
D103, 104, 203, 204 : LN442YP
D105～107, 205～207 : LN242RP

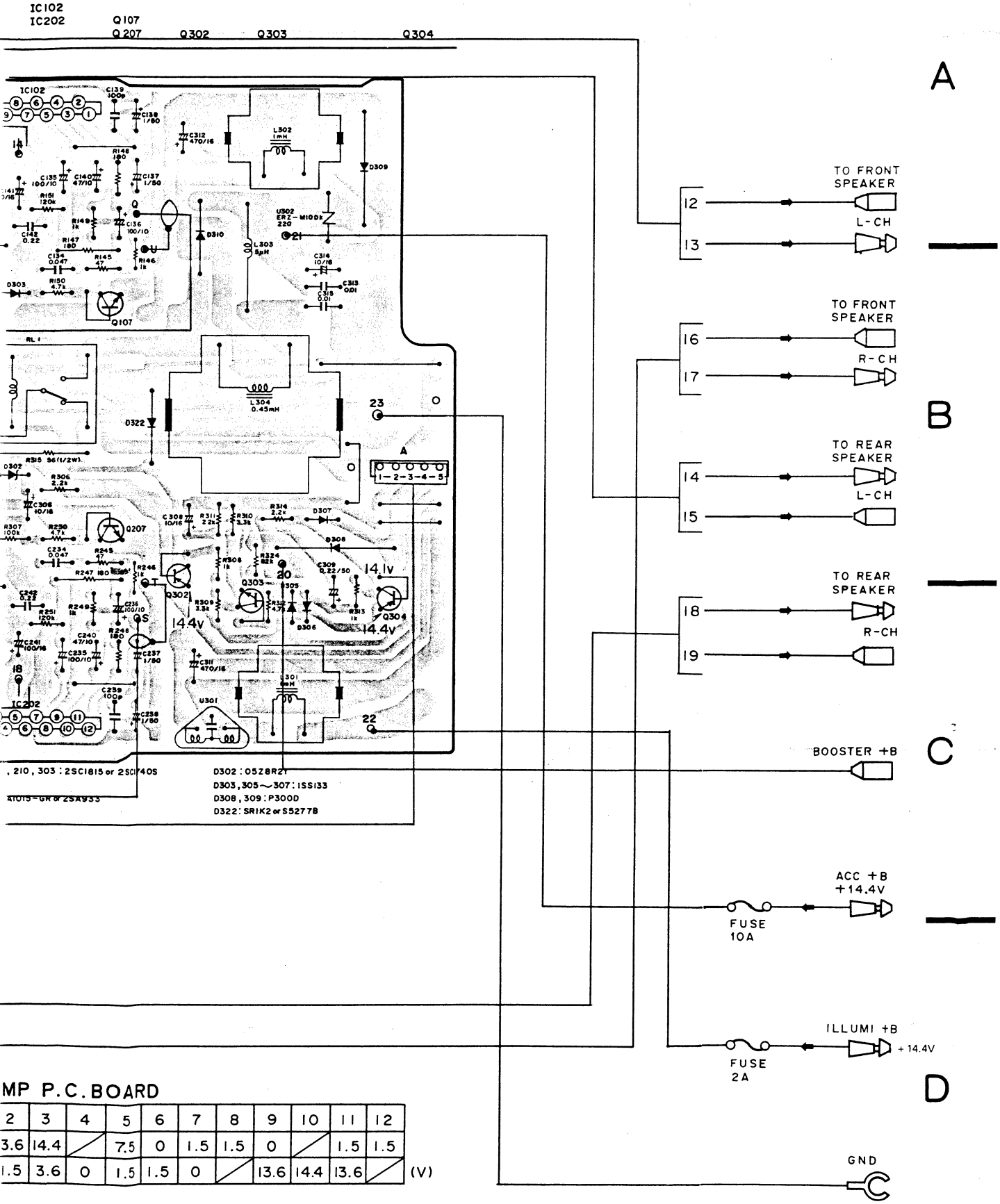
IL301, 302 : Lamp, 14V 50mA
CEL-171

VOLUME P.C . BOARD



D311～318 : LN405YCPP

IL303 : Lamp, 14V 50mA
CEL-171

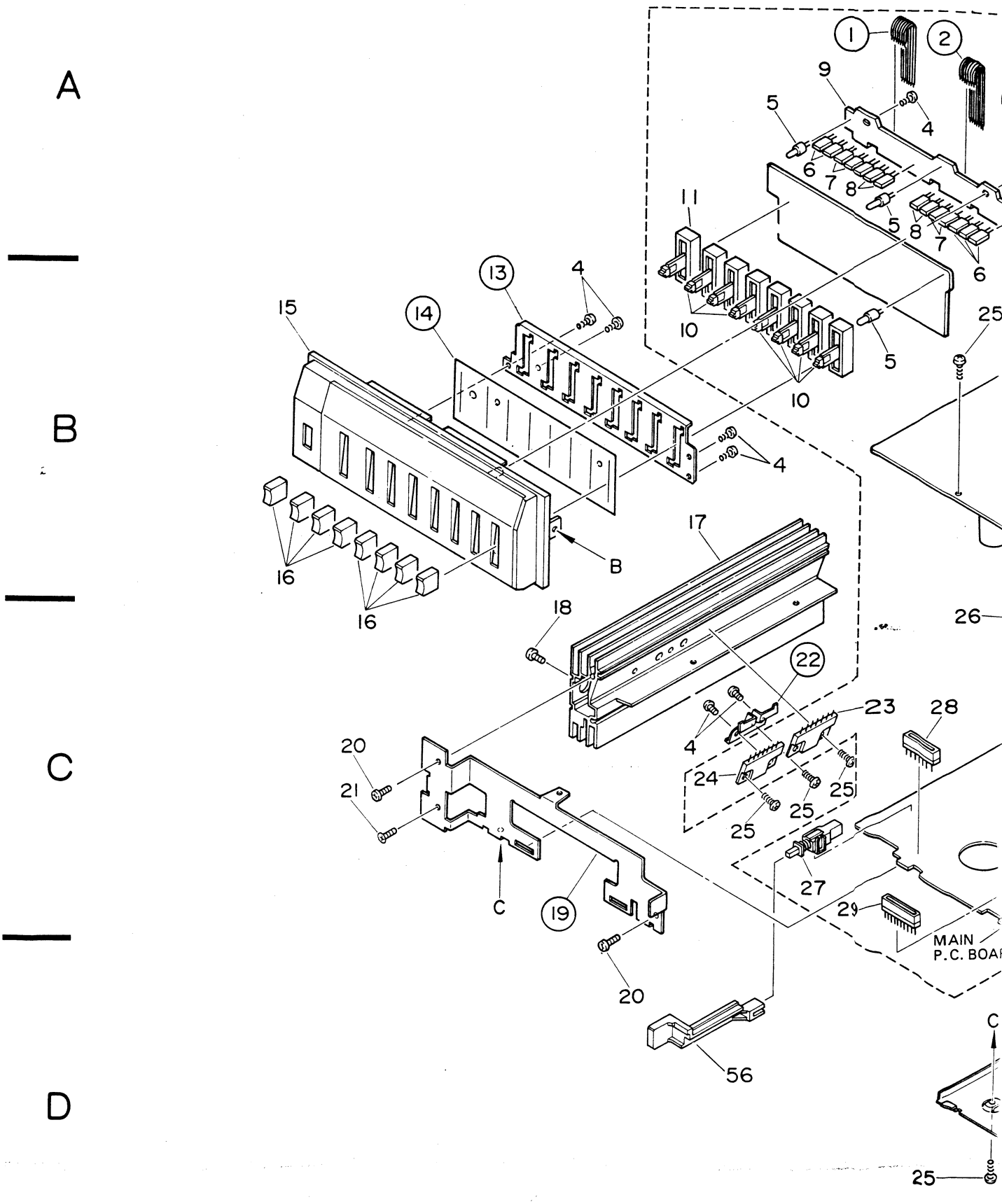


MP P.C.BOARD

2	3	4	5	6	7	8	9	10	11	12	
3.6	14.4		7.5	0	1.5	1.5	0		1.5	1.5	
1.5	3.6	0	1.5	1.5	0		13.6	14.4	13.6		(V)

Fig. 16

10.EXPLODED VIEW



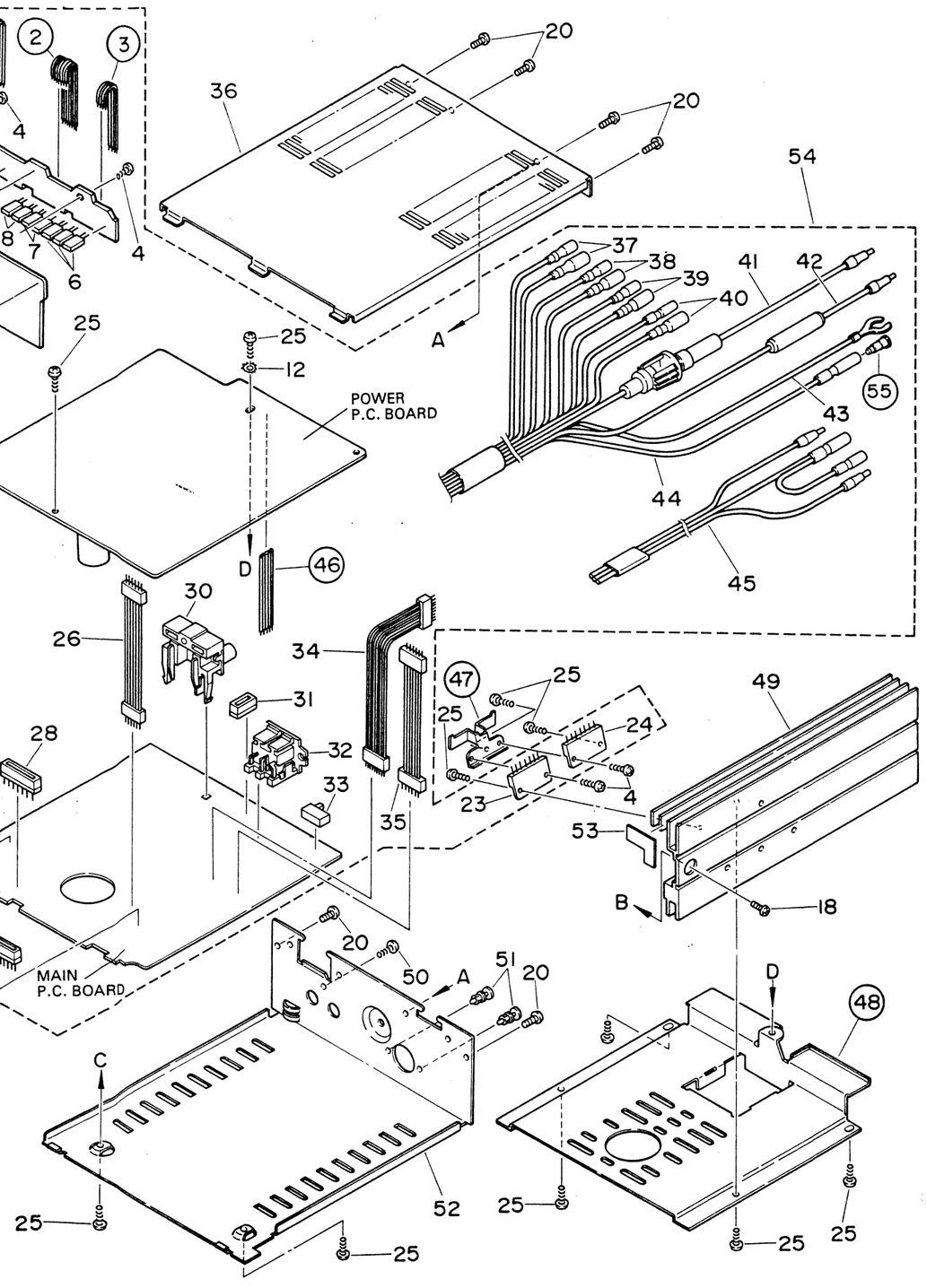


Fig. 17

• Parts List

NOTE:

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

Mark	No.	Part No.	Description
	1.		Connector (7P)
	2.		Connector (7P)
	3.		Connector (3P)
	4.	CBA-187	Screw, M2×5
★★	5.	CEL-171	Lamp, 14V 50mA
★	6.	LN242RP	LED
★	7.	LN442YP	LED
★	8.	LN342GP	LED
	9.	CNL-905	P.C. Board
★★	10.	CCW-020	Volume (GRAPHIC EQ)
★★	11.	CCW-021	Volume (FADER)
	12.	WH26FMC	Washer
	13.		Bracket
	14.		Felt
	15.	CXD-702	Grille Assy
	16.	CXD-703	Knob Assy
	17.	CNR-256	Heat Sink
	18.	CBA-189	Screw, M2.6×6
	19.		Bracket
	20.	CBA-191	Screw, M3×6
	21.	CBA-193	Screw, M3×6
	22.		Braket
★★	23.	TA7270P	IC
★★	24.	TA7271P	IC
	25.	CBA-188	Screw, M2.6×6
	26.	CDV-001	Connector (6P)
★★	27.	CSG-254	Switch (DEFEAT)
	28.	CDK-236	Connecter (7P)
	29.	CDK-237	Connecter (10P)
	30.	CKN-085	RCA Jack (BP-780/US, CA, ES)

Mark	No.	Part No.	Description
	31.	CDK-235	Connector (5P)
	32.	CKS-614	DIN Jack
★★	33.	CSH-085	Switch (BP-780/US,CA,ES)
		CSH-086	Switch (BP-780/EW)
	34.	CDV-003	Connector (9P)
	35.	CDV-002	Connector (6P)
	36.	CNB-925	Case
	37.	CDK-238	Cord (Front Lch)
	38.	CDK-239	Cord (Rear Lch)
	39.	CDK-240	Cord (Front Rch)
	40.	CDK-241	Cord (Rear Rch)
	41.	CDK-244	Cord
	42.	CDK-243	Cord
	43.	CDK-242	Cord
	44.	CDK-246	Cord
	45.	CDK-247	Cord (BP-780/US,CA,ES)
	46.		Connector (5P)
	47.		Bracket
	48.		Shield Plate
	49.	CNR-257	Heat Sink
	50.	CBA-194	Screw, M3×10 (BP-780/US,CA,ES)
	51.	CMB-031	Rivet
	52.	CNA-303	Chassis (BP-780/US,CA,ES)
		CNA-304	Chassis (BP-780/EW)
	53.	CNN-452	Insulator
	54.	CWK-376	Amp Unit (BP-780/US, CA, ES)
		CWK-385	Amp Unit (BP-780/EW)
	55.		Cover
★	56.	CAE-064	Button

11.ELECTRICAL PARTS LIST

NOTE:

When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 × 10¹*	*561*	*RD1/4PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*		*RN1/4SR 5 6 2 1 F*

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

Amp Unit (CWK-376) (BP-780/US, CA, ES)

Caution:
The parts of the MAIN P.C. BOARD and POWER P.C. BOARD are recorded together.

MISCELLANEOUS

Mark	Symbol & Description	Part No.
★★	IC1012, IC202	TA7271P
★★	IC102, IC201	TA7270P
★★	IC103, IC203	IR2E02
★★	IC301	PA2014
★★	IC302, IC303	TA75558S or NJM4558S
★★	IC304	TA75558P or NJM4558
★★	IC305	TA7362P
★★	Q101 – Q110, Q201 – Q210, Q303	2SC1815 or 2SC1740S
★★	Q301	2SC1959-Y or 2SD1292-R
★★	Q302, Q304, Q305	2SA1015-GR or 2SA933
★	D301, D302	05Z8R2Y
★	D303-D307, D321	1SS133
★	D308, D309	P300D
★	D310, D319, D320, D322	S5277B or SR1K2
	L301 Transformer	CTH-094
	L302 Transformer	CTH-092
	L303 Transformer	CTH-093
	L304 Transformer	CTH-091
	RL1 Relay	CSR-047
★★	S1 Switch (MODE SELECTOR)	CSH-085
★★	S2 Switch (DE FEAT)	CSG-254
	U301 Capacitor	CCG-081
	U302	ERZ-M0DK220

RESISTORS

Mark	Symbol & Description	Part No.
	R101 – R108, R111 – R135, R138 – R162, R201-R208, R211-R235, R238-R259, R301-R314, R323	RD1/6PS □□□J
	R315	RD1/2PS □□□JL
	R316	RD1/4PM□□□JL

CAPACITORS

Mark	Symbol & Description	Part No.
	C101, C102, C104, C123, C125, C137, C138, C146-C148, C201, C202	CEA010M50L2
	103, C106, C203, C206	CEA2R2M50L2
	C102, C207	CEAR68M50L2
	C108, C208	CEAR47M50L2
	C109, C209, C309	CEAR22M50L2
	C110, C113, C210, C213	CQFA104J50L
	C111, C211	CQFA273J50L
	C112, C212	CQFA103J50L
	C114, C214	CQFA823J50L
	C115, C122, C134, C215, C222, C234	CQFA473J50L
	C116, C120, C216, C220	CQFA333J50L
	C117, C217	CQFA223J50L
	C118, C218	CQMA392J50
	C119, C219	CQPA471J50
	C121, C221, C306, C308, C314	CEA100M25L2
	C124, C139, C224, C239	CKDYB101K50L
	C126, C127, C135, C136, C226, C227, C235, C236, C304, C305	CEA101M10L2
	C128, C132, C141, C145, C228 C232, C241, C245	CEA101M16L2
	C129, C131, C142, C144, C229, C231, C242, C244	CKDBAR22K25
	C130, C143, C230, C243	CQFA224J50
	C133, C140, C233, C240, C303	CEA470M10L2
	C149, C249, C310	CEAR47M25L2
	C204, C223, C225, C237, C238 C246-C248, C316	CEA010M50L2
	C301	CKDYB103Z50L
	C302	CEA471M16L2
	C307	CEA472M16L2
	C311, C312	CEA471M16L2
	C313, C315	CKDYB103Z50L

Amp Unit (CWK-385) (BP-780/EW)

Caution:
The parts of the MAIN P.C. BOARD and POWER P.C. BOARD are recorded together.

MISCELLANEOUS

Mark	Symbol & Description	Part No.
★★	IC101, IC202	TA7271P
★★	IC102, IC201	TA7270P
★★	IC103, IC203	IR2E02
★★	IC302, IC303	TA75558S or NJM4558S
★★	IC304	TA75558P or NJM4558
★★	IC305	TA7362P
★★	Q101-Q110, Q201-Q210, Q303	2SC1815 or 2SC1740S
★★	Q301	2SC1959-Y or 2SD1292-R
★★	Q302, Q304, Q305	2SA1015-GR or 2SA933
★	D301, D302	05Z8R2Y
★	303-D307, D321	1SS133
★	D308, D309	P300D
★	D310, D319, D320, D322	S5277B or SR1K2
	L301 Transformer	CTH-094
	L302 Transformer	CTH-092
	L303 Transformer	CTH-093
	L304 Transformer	CTH-091
	RL1 Relay	CSR-047
★★	S1 Switch (MODE SELECTOR)	CSH-086
★★	S2 Switch (DEFEAT)	CSG-254
	U301 Capacitor	CCG-081
	U302	ERZ-M10DK220

RESISTORS

Mark	Symbol & Description	Part No.
	R105-R108, R111-R135, R138-R162, R205-R208, R211-R235, R238-R259, R302-R314, R323	RD1/6PS□□□J
	R315	RD1/2PS□□□JL
	R316	RD1/4PM□□□JL

12.PACKING MEHOD

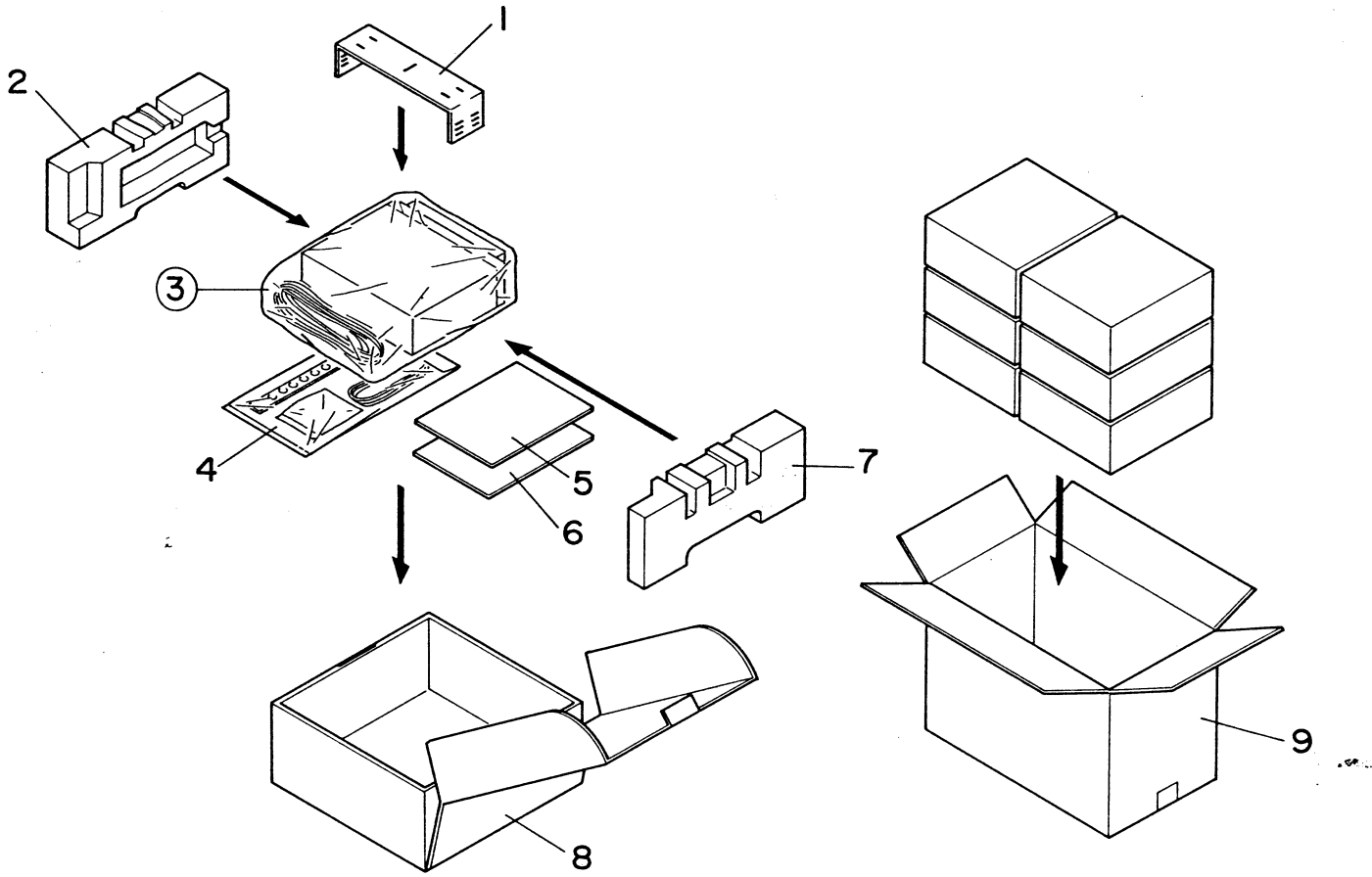


Fig. 18

NOTE:

- *Parts whose parts numbers are omitted are subject to being not supplied.*

• Parts List

Mark	No.	Part No.	Description
	1.	CNB-791	Mounting Bracket
	2.	CHF-072	Styrofoam
	3.		Cover
	4.	CEB-096	Accessory Kit
	4-1.	CDE-437	Cord
	4-2.	CNF-111	Strap
	4-3.	CEB-095	Screw Kit
	4-3-1.	CBA-028	Screw for Strap
	4-3-2.	CBA-101	Screw, M4×6
	4-3-3.	CBA-102	Screw, M5×16
	4-3-4.	CBF-168	Washer
	4-3-5.	CBN-040	Nut
	4-3-6.	CBN-041	Nut
	5.	CRB-527	Owner's Manual (BP-780/US,CA) (English)
		CRD-555	Owner's Manual (BP-780/EW) (English, French, German, Spanish)
		CRD-557	Owner's Manual (BP-780/ES) (English, French, Spanish, Arabic)
	6.	CRB-528	Owner's Manual (BP-780/CA) (French)
		CRD-556	Owner's Manual (BP-780/EW) (Swedish, Norwegian, Dutch, Italian)
	7.	CHF-073	Styrofoam
	8.	CHF-074	Carton (BP-780/US)
		CHF-075	Carton (BP-780/CA)
		CHF-076	Carton (BP-780/EW)
		CHF-077	Carton (BP-780/ES)
	9.	CHF-078	Contain Box (BP-780/US)

CAPACITORS

Mark	Symbol & Doccription	Part No.
	C104, C123, C125, C137, C138 C146 – C148	CEA010M50L2
	C106, C206	CEA2R2M50L2
	107, C207	CEAR68M50L2
	108, C208	CEAR47M50L2
	C109, C209, C309	CEAR22M50L2
	C110, C113, C210, C213	CQFA104J50L
	C111, C211	CQFA273J50L
	C112, C212	CQFA103J50L
	C114, C214	CQFA823J50L
	C115, C122, C134, C215, C222, C234	CQFA473J50L
	C116, Ç120, C216, C220	CQFA333J50L
	C117, C217	CQFA223J50L
	C118, C218	CQMA392J50
	C199, C219	CQPA471J50
	C121, C221, C306, C308, C314	CEA100M25L2
	C124, C139, C224, C239	CKDYB101K50L
	126, C127, C135, C136, C226, C227, C235, C236, C304, C305	CEA101M10L2
	C128, C132, C141, C145, C228, C232, C241, C245	CEA101M16L2
	C129, C131, C142, C144, C229, C231, C242, C244	CKDBAR22K25
	C130, C143, C230, C243	CQFA224J50
	C133, C140, C233, C240, C303	CEA470M10L2
	C149, C249, C310	CEAR47M25L2
	C204, C223, C225, C237, C238, C246-C248, C316	CEA010M50L2
	C307	CEA472M16L2
	C311, C312	CEA471M16L2
	313, C315	CKDYB103Z50L

Meter P.C. Board

Mark	Symbol & Description		Part No.
★	D101, D102, D201, D202	LED	LN342GP
★	D103, D104, D203, D204	LED	LN442YP
★	D105-D107, D205-D207	LED	LN242RP
★★	IL301, IL302	Lamp, 14V 50mA	CEL-171
	R320	Resistor	RS1P□□□JL

Volume P.C.Board

Mark	Symbol & Description		Part No.
★	D311-D318	LED	LN406YCPP
★★	VR101-VR107	Volume, 50kΩ(G)	CCW-020
★★	VR108	Volume, 20kΩ(G)	CCW-021
★★	IL303	Lamp, 14V 50mA	CEL-171
	R136, R137, R236, R237	Resistor	RD1/6PS□□□J
	R371 – R319, R321	Resistor	RD1/4PM□□□J